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NOTE BY THE SECRETARY-GENERAL

The Secretary-General has the honour to transmit to the members of the Security Council the attached communication which he has received from the Director-General of the International Atomic Energy Agency (IAEA).

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Annex

Letter dated 30 September 1991 from the Director-General
of the International Atomic Energy Agency addressed to
the Secretary-General

Please find attached the report of the fifth IAEA inspection in Iraq under Security Council resolution 687 (1991). You may deem it appropriate to transmit the report to the members of the Security Council. I remain of course available with the Chief Inspector, Mr. Leslie Thorne for any consultations you or the Council may wish to have.

(Signed) Hans BLIX

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Enclosure

**REPORT ON THE FIFTH IAEA ON-SITE INSPECTION
IN IRAQ UNDER
SECURITY COUNCIL RESOLUTION 687 (1991)**

14 - 20 September 1991

INTERNATIONAL ATOMIC ENERGY AGENCY

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1991-09-25

REPORT ON THE FIFTH IAEA ON-SITE INSPECTION IN IRAQ
UNDER SECURITY COUNCIL RESOLUTION 687 (1991)

14 - 20 September 1991

SALIENT POINTS

The inspection achieved the primary objective of ensuring that an inspection team was in Iraq during the period between major inspections to carry out follow-up work. This included:

- A check of all seals on nuclear material and hot cells. Two seals had been cut and one was missing. No explanation has been found, but no sinister purpose is obvious.
- An attempt to verify the inventory of nuclear material under seal. Confusion in the operators' labelling and bookwork requires more extensive work during future inspections.
- An inspection and NDA measurement of the fuel at the IR1 5000 reactor. 30% of the fuel was measured by random sampling, but 13 assemblies were inaccessible.
- Transport of the clandestinely produced plutonium.
- The taking and shipment of 115 samples.
- The shipment of a 93% enriched metal fuel plate.
- A preliminary investigation of the heavy water situation, which, however, produced no new information.
- An investigation into the extent of the chemical enrichment program, which is considered inconclusive.
- An examination of the mass spectrographs which have been recovered.

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INTRODUCTION

1. The fifth inspection in Iraq under the terms of Security Council Resolution 687 took place from 14 to 20 September 1991. The team consisted of nine inspectors, with supporting staff consisting of two health physicists, a doctor and a medical auxiliary, a photographer and a communications specialist - i.e. fifteen people overall. Nine nationalities were represented among the inspectors and thirteen overall. Eight of the nine inspectors were from the staff of the IAEA. The ninth inspector was a chemical enrichment expert from an IAEA Member State.
2. The objectives of the inspection were limited to the carrying out of routine activities necessary as a follow-up to previous inspections. There was no intention to initiate new investigative activities, which were to be left to later, larger teams. In summary the objectives were to verify the seals which had earlier been placed on material and equipment and to verify (by the non-destructive analysis of random samples) that the material present was as declared. Additional tasks were to remove the bulk of the plutonium from the country; to take a rather large number of samples for destructive analysis, to complement previous samples; to establish the heavy water inventory; and to enquire further into the extent of Iraq's chemical enrichment program.

Hot Cells and Related Equipment

3. The hot cells and associated manipulators examined during the first inspection had been placed under seal during the third inspection to prevent any possibility of their further use. All such seals were checked. Out of twenty-four seals, twenty-one were found to be in good condition. Two seals were found to have been cut, but were still in place, and one seal was missing.

The Iraqi counterparts could offer no explanation other than to suggest that thieves had been attempting to recover scrap. This is highly implausible, but there seemed to be no plausible sinister explanation. Surrounding rubble from the bombing appeared to be undisturbed, and seals which had been applied to the two neighbouring cells were still intact. The sealing blocks at the back of the cells had been removed before the first inspection and were still lying damaged in the rubble.

4. Paper seals which had been applied to the doors of cells with reprocessing equipment in building B9 were intact. Metal seals which had been applied to the manipulators were removed for verification. The equipment in these cells is still intact, and paper sealing is not an adequate long-term protection. The removal or destruction of this equipment is necessary.

Inventory of Nuclear Material

5. As a result of the third and fourth inspections, several hundred tons of nuclear material had been collected into storage locations at Tuwaltha. In many cases, collection had been carried out in a hurry, without adequate paperwork. Some containers, which had been buried in the desert, were in poor condition. One of the objectives of this inspection was to go through this material and the associated records and establish a reliable inventory. The task proved even more difficult than expected and was not satisfactorily completed by the time of the team's departure. A larger team working full-time solely on this task for at least a week is required. The National Inspector for Iraq admitted that the figures he was using were from before burial took place and did not allow for any failure to recover the material totally. Random sampling therefore is not based on a known population and has no firm statistical basis. The first requirement is to establish with confidence what material is present. Until this is done, attempts to track the history of the material have no sound basis.
6. To understand the problem, one must realize that many hundreds of drums in several warehouses and dumps are involved. Also, some of the material is in a variety of inadequate containers - such as polythene bags - without proper labelling. Even when one has a sound container in an apparently well identified stratum, one cannot be sure what material is in it. For example, one sound drum apparently containing uranium trioxide was found - on being opened - to contain no less than six different types of material ranging from ore to metal turnings. Drums labelled "uranium oxide" appeared to be full of sand. It is possible that the declared contents are beneath the sand and that, as the Iraqis claim, the sand is the result of desert burial - but this has to be established. The National Inspector was made aware of the serious concerns of the team and of the impossibility of the team's accepting the Iraqi accounts in their present state.

Samples

7. Destructive analysis of material sampled in previous inspections had shown in some cases a highly significant difference in results between the laboratories in the USA and the Safeguards Analytical Laboratory (SAL). A sampling and analysis expert included in the team for this mission repeated some of the sampling in order to ensure that the sampling procedures were carried out correctly. His presence proved invaluable and it is strongly recommended that a similar expert be included in future teams. A total of 115 samples were taken.
8. In addition to routine sampling, the expert packaged and prepared for transport the plutonium which had been clandestinely produced from diverted uranium and later declared to inspectors. A small quantity of highly diluted material remains together with 33 sealed ampoules of plutonium-238 and six of plutonium-239. These are labelled and in the form in which they were originally shipped from the Amersham (UK) supplier. In all, 4.868 grams of plutonium have now been taken out of the country, leaving only 0.274 gram of plutonium.

Fuel Measurements

9. Previous inspections had raised several important questions about the history of the fuel associated with the IRT 5000 reactor. These questions related both to the irradiated fuel still in the core, the reactor pool and the spent fuel store and to the unirradiated fuel in the store known as location A. A major objective of this inspection was to attempt to measure by non-destructive means the activity of this fuel and, from an analysis of the measurements, to determine the history of the irradiated fuel. Knowing its history would be important in determining whether clandestine irradiation had taken place and in estimating the extent of possible plutonium production. Non-destructive analysis of the fresh fuel would establish whether any removal of material may have taken place.
10. As a result of intensive work in very difficult conditions, it was possible to measure 15 assemblies of 93 % enrichment and two natural uranium assemblies (approximately 30% of the irradiated fuel) and to item-count the IRT 5000 and Tamuz reactor fresh fuel. Measurement of all the irradiated fuel was not possible, owing to high radiation levels caused by low water levels in the IRT 5000 reactor core and the storage locations. The low water level in the core prevented 13 of the fuel assemblies being lifted to more accessible measuring positions. Twenty-two of the remaining 63 assemblies in the pond and spent fuel store were measured on a random basis. The low water level in storage location B led to radiation levels of 50mSv/hr(5R/hr) at some of the working surfaces. A firm request was made to the Iraqi counterpart to increase the water level and to provide water treatment in a recommended form. On the positive side it must be recorded that the reactor core pond had been cleaned, so that visual examination of the fuel is much easier now than during previous inspections.
11. Detailed analysis of the measurements will take time. As a complement to the non-destructive measurements, one plate from the Tamuz fuel was packaged and removed to the IAEA laboratories at Seibersdorf, near Vienna.
12. During item-counting of the fresh fuel, two of the Soviet-type fuel assemblies were found to have had the top and bottom inert parts cut off. The Iraqi counterpart was asked for an explanation and gave the one which he claimed had been given to the first inspection team - i.e. that this had been done by mistake in the immediate aftermath of the first attack, when staff were trying to remove the fuel from the reactor site and could not get the fuel into the container. He volunteered that it was "a stupid thing to do", but cited the extremely excited condition of the personnel following the attack. IAEA records of the safeguards inspection in November show that the fuel was intact at that time, which is in line with the claim that the cutting was recent. However, the cuts seem to be rather more clean and precise than the cuts which a panic situation would produce. The evidence is inconclusive as between the Iraqi explanation and the hypothesis that the cutting was a preliminary to removal of the highly enriched component of the assembly.

Heavy Water

13. Questions were formally put relating to the quantity and location of heavy water. Three tons at least were known to have been supplied to Iraq in 1980. The counterpart replied that the required information had been given to the first inspection team, but there is no record of this. The counterpart stated that the heavy water had been stored at the Tamuz site and had not been used, owing to destruction of the Tamuz 1 reactor in 1981. During the bombing this year, the tank containing the heavy water split and the water escaped. The team were shown the tank in the bombed remains of the reactor; its condition was as described by the Iraqis. On the other hand, there is no way after such a long time of taking meaningful samples of the debris in order to establish whether the heavy water had been removed prior to the bombing. The question of quantity and location must remain open. The existence of any other heavy water was firmly denied.

Chemical Enrichment

14. Questions about the chemical enrichment program were put to the Iraqis at a formal meeting and were followed by visits to the site of the experimental facilities. The meeting produced no fresh information. The inspection of the site also failed to provide fresh information, the site having been cleared after being bombed. No trace remained of any equipment and, although smears were taken of the floors, evidence of the use of scrubbing machines suggests that these will not produce meaningful results.
15. The chemical enrichment expert who was a member of the team is of the opinion that a far from full disclosure has been made and that other facilities must exist. However, no evidence was presented to the other members of the team to support this belief.

Mass Spectrometers

16. The team had been assigned the task of checking the situation regarding mass spectrometers. One had been recovered from the rubble and the remains were inspected at Tuwalitha. This machine cannot be re-used. Four other machines were declared to be in existence, but were stated to have been so damaged when being recovered after the bombing that they were unusable. They were stored at the Geological Institute in Baghdad. A visit was paid to this site by the mass spectrometer expert on the team. Two of the machines (THQ machines) were from the Tarmiya site, where they were declared to have been used for product monitoring. Of the other two machines (MAT 26 machines), one had been used for work with gases (probably UF₆), and one for work with solids. The wiring had been damaged, but they were otherwise in good condition and - in the opinion of the expert - could be rebuilt and used. The Iraqis expressed a wish to transfer the machines to institutes where they could be put to good use.

Removal of Fuel

17. Regarding the fuel which was to be removed from Iraq, the question was raised of insurance and legal responsibility for that fuel while it was being moved in Iraq. Mr Sami Al-Araji agreed that this was clearly Iraq's responsibility. Iraq would be responsible for safety and legal aspects until the fuel was loaded into the aircraft. He was keen for Iraq to be responsible for as much as possible in order to reduce costs for which Iraq would ultimately be charged. He even offered to transport any material to any other country.

Site Clearance

18. The Iraqis expressed an urgent desire to proceed with site clearance and renovation. They cited the psychological effect upon site staff as a reason. To anyone who has spent an appreciable time at this site, the reason is certainly plausible. The Iraqis were told that, while there would be no objection in principle to the removal of bombed structures, the Agency/Special Commission must be informed in advance so that the work could be authorized and adequately monitored.

Equipment

19. No attempt was made to inspect equipment recovered by the third and fourth inspection teams. This is to be done by a later team with suitable experts. The Iraqis expressed a strong wish to dispose of all recovered equipment as soon as possible, citing problems of security with the present dump sites. On the lines of the response given with regard to site clearance (see previous paragraph), the Iraqis were told that any proposals must be submitted in advance so that due consideration could be given to them.

Standards

20. Questions relating to analytical standards were asked. The Iraqis emphatically denied that they had any foreign analytical standards. They explained that they had tried to obtain some in 1985 or thereabouts but had met with an export embargo. As a result, they had had to generate their own secondary analytical standards.
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